

[0040] What is claimed is:

1. A method for handing off a Mobile Node (MN) from a cellular network to a Wireless Local Area Network (WLAN), the method comprising the steps of:
 - a) receiving at a WLAN Integration Gateway (WIG) node mobility information relative to the MN;
 - 5 b) identifying by the WIG node a source Service GPRS Support Node (SGSN) that lastly serviced the MN in the cellular network based on the mobility information;
 - c) obtaining by the WIG node Packet Data Protocol (PDP) Context information relative to the MN from the identified source SGSN;
 - d) establishing a GPRS Tunnelling Protocol (GTP) tunnel for use by the MN between the
10 WIG node and a Gateway GPRS Support Node (GGSN).
2. The method claimed in claim 1, wherein step a) comprises the step of:
 - a.1) sending from the MN to the WIG node, via an Access Point (AP) of the WLAN, the mobility information.
3. The method claimed in claim 2, wherein the mobility information comprises:
 - an IP address assigned to the MN by the cellular network; and
 - Routing Area Identification (RAI) information relative to a routing area where the MN was serviced in the cellular network before the handoff to the WLAN.
4. The method claimed in claim 3, wherein the mobility information further comprises at least one identifier from the set of identifiers consisting of:
 - a Mobile Station Integrated Services Digital network Number (MSISDN);
 - an International Mobile Subscriber Identity (IMSI);
 - 5 a Packet Temporary Mobile Subscriber Identity (PTMSI); and
 - a Temporary Logical Link Identity (TLLI).

5. The method claimed in claim 3, wherein step b) comprises the step of:
b.1) translating by the WIG node the RAI information received from the MN into an identification of the source SGSN.
6. The method claimed in claim 1, wherein step d) comprises the step of:
d.1) sending a PDP Context Update message from the WIG node to the GGSN.
7. The method claimed in claim 6, wherein step d) further comprises the step of:
d.2) responsive to a receipt of the PDP Context Update message by the GGSN, updating by the GGSN a GTP routing table of the GGSN.
8. The method claimed in claim 1, further comprising the steps of:
e) assigning by the WIG node a new IP address to the MN that was originally provisioned with an original IP address by the cellular network;
f) for MN's uplink traffic, the WIG node
5 translating the new IP address of the MN into the original IP address for each received IP datagram generated by the MN that comprises the new IP address;
relaying uplink IP datagrams with the original IP address to the GGSN over the GTP tunnel;
g) for MN's downlink traffic, the WIG node
10 translating the original IP address of the MN into the new IP address for each received IP datagram destined to the MN; and
relaying downlink IP datagrams with the new IP address to the MN.

9. The method claimed in claim 1, further comprising the step of:
e) assigning by the WIG node a new IP address to the MN that was originally provisioned with an original IP address by the cellular network;

f) for MN's uplink traffic, the WIG node

5 receiving IP datagrams generated by the MN, wherein each one of the IP datagrams comprises the new IP address of the MN and encapsulates another IP datagram comprising the original IP address of the MN;

decapsulating each one of the IP datagrams generated by the MN so as to leave the IP datagrams comprising the original IP address of the MN;

10 relaying in the uplink the decapsulated IP datagrams to the GGN over the GTP tunnel;

g) for MN's downlink traffic, the WIG node

receiving IP datagrams destined to the MN, wherein each one of the IP datagrams comprises the original IP address of the MN;

15 encapsulating each one of the IP datagrams into an IP datagram comprising the new IP address of the MN; and

relaying to the MN the encapsulated IP datagrams.

10. A Wireless Local Area Network Integration Gateway (WIG) node for use in a Wireless Local Area Network (WLAN), the WIG node comprising:
- a WLAN functionality for supporting data communications with WLAN clients, the WLAN functionality receiving mobility information relative to a roaming Mobile Node (MN) equipped with a WLAN client;
 - a service layer identifying based on the mobility information a source Service GPRS Support Node (SGSN) that lastly serviced the MN in a cellular network; and
 - a GTP stack module for supporting General Packet Radio Service (GPRS) Tunnelling Protocol (GTP) communications, the GTP stack obtaining Packet Data Protocol (PDP) Context information relative to the MN from the identified source SGSN, and establishing with a Gateway GPRS Support Node (GGSN) a GTP tunnel for use by the MN.
11. The WIG node claimed in claim 10, wherein the MN sends the mobility information to the WIG node via an Access Point (AP) of the WLAN.
12. The WIG node claimed in claim 11, wherein the mobility information comprises:
- an IP address assigned to the MN by the cellular network; and
 - Routing Area Identification (RAI) information relative to a routing area where the MN was serviced in the cellular network before a handoff to the WLAN.
13. The WIG node claimed in claim 12, wherein the mobility information further comprises at least one identifier from the set of identifiers consisting of:
- a Mobile Station Integrated Services Digital network Number (MSISDN);
 - an International Mobile Subscriber Identity (IMSI);
 - a Packet Temporary Mobile Subscriber Identity (PTMSI); and
 - a Temporary Logical Link Identity (TLLI).

14. The WIG node claimed in claim 12, wherein for identifying the source SGSN, the service layer of the WIG node translates the RAI information received from the MN into an identification of the source SGSN.

15. The WIG node claimed in claim 10, wherein for establishing the GTP tunnel, the GTP stack sends a PDP Context Update message to the GGSN.

16. The WIG node claimed in claim 10, wherein the WIG node assigns a new IP address to the MN that was originally provisioned with an original IP address by the cellular network, and for MN's uplink traffic, the WIG node:

5 translates the new IP address of the MN into the original IP address for each received IP datagram generated by the MN that comprises the new IP address;

relays uplink IP datagrams with the original IP address to the GGSN over the GTP tunnel;

for MN's downlink traffic, the WIG node:

10 translates the original IP address of the MN into the new IP address for each received IP datagram destined to the MN; and

relays downlink IP datagrams with the new IP address to the MN.

17. The WIG node claimed in claim 10, wherein the WIG node assigns a new IP address to the MN that was originally provisioned with an original IP address by the cellular network, and

for MN's uplink traffic, the WIG node:

5 receives IP datagrams generated by the MN, wherein each one of the IP datagrams comprises the new IP address of the MN and encapsulates another IP datagram comprising the original IP address of the MN;

decapsulates each one of the IP datagrams generated by the MN so as to leave the IP datagrams comprising the original IP address of the MN;

10 relaying in the uplink the decapsulated IP datagrams to the GGN over the GTP tunnel;

for MN's downlink traffic, the WIG node:

receives IP datagrams destined to the MN, wherein each one of the IP datagrams comprises the original IP address of the MN;

15 encapsulates each one of the IP datagrams into an IP datagram comprising the new IP address of the MN; and

relays to the MN the encapsulated IP datagrams.